

Infectious Disease Success Stories for Alaska Natives

Tom Hennessy, MD, MPH
Director,
Arctic Investigations Program
Division of Emerging Infections and
Surveillance Services (DEISS)
NCPDCID
Anchorage, Alaska
thennessy@cdc.gov

Alaska Natives

- The indigenous people of Alaska
 - Eskimos: Inuit, Yupik
 - Aleuts
 - Athabaskan
 - Coastal Tribes: Haida, Tlingit, Tsimshian
- 21 Languages
- 2000 Census: 120,000 persons
 - ~20% of State population

Alaska Native Demographics

- 60% live in rural areas
- 1/2 under age 20
 - 1/3 for general US population
- Median income 1/2 that of non-Natives
 - Unemployment high
 - Housing older, more crowded
 - 35% of villages without running water, flush toilets

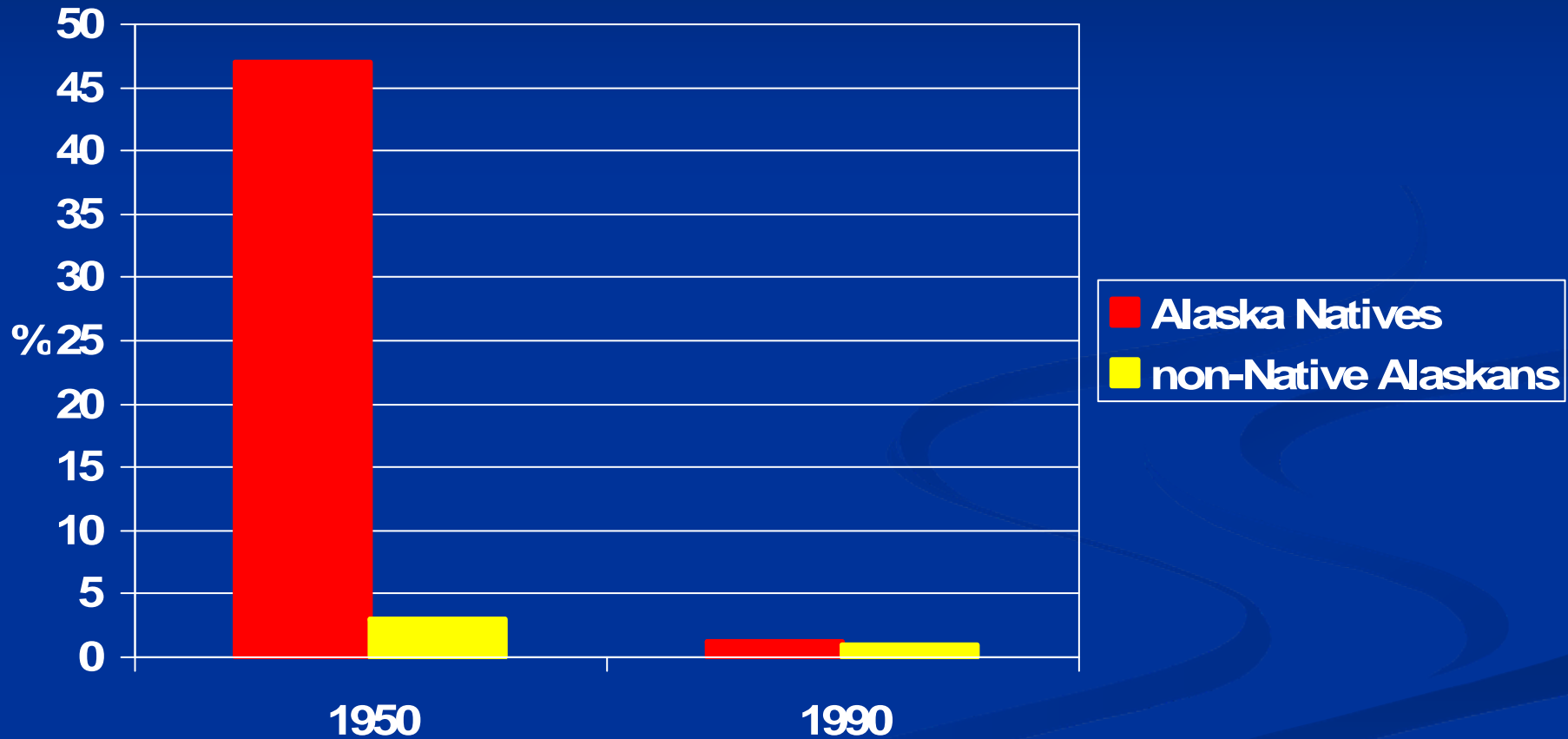
Alaska Native Health Issues

- Historical: Lack of health care
 - Infectious diseases
 - Maternal-child health
 - Malnutrition
- Today: Lifestyle related illnesses
 - 50% smoking prevalence
 - Increasing cardiovascular disease
 - Dietary changes
 - Increasing diabetes
 - Sedentary lifestyle
 - Increasing obesity
 - Substance and Domestic abuse

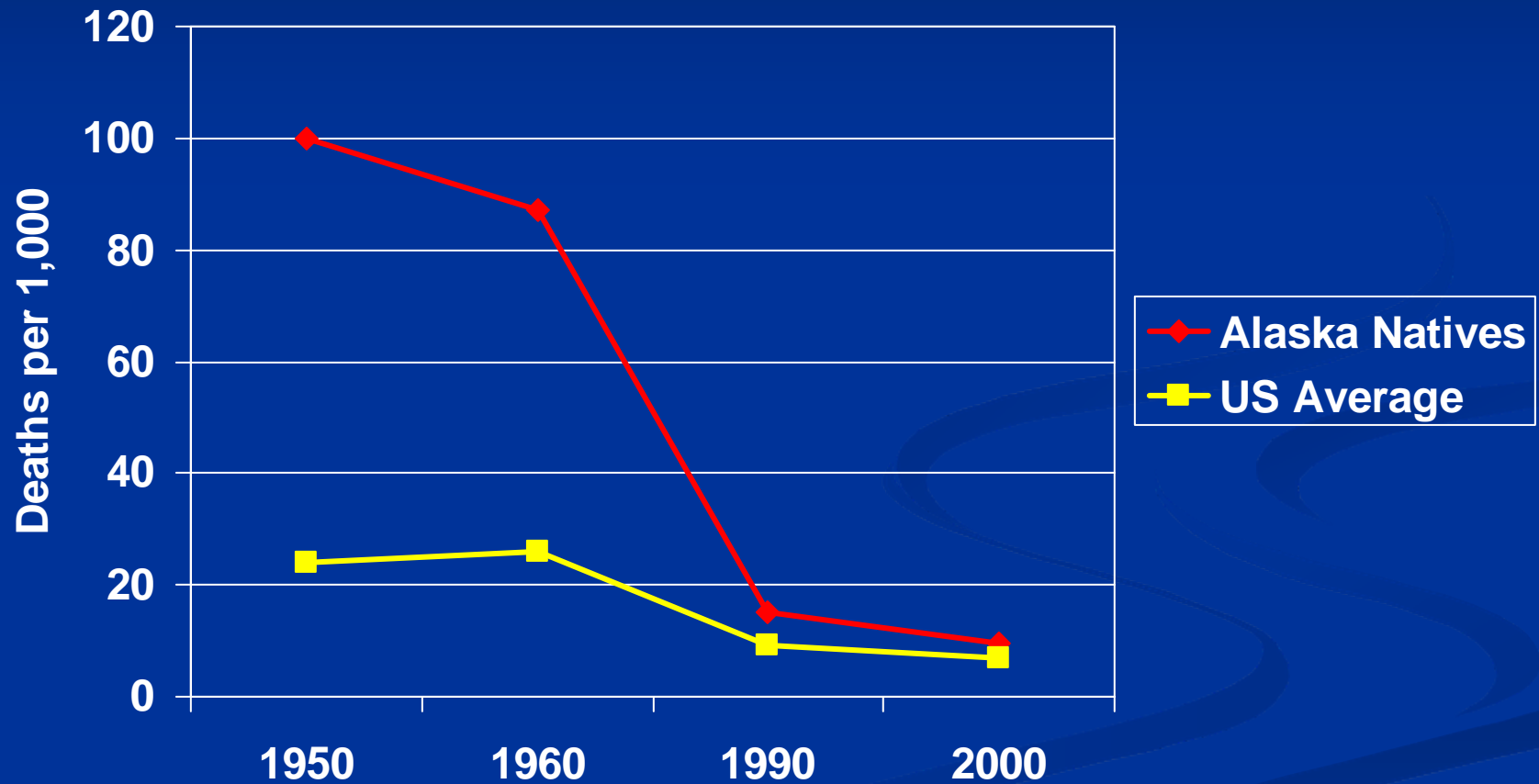
Health Care Delivery

- Indian Health Service, 1955
- Transition to Tribal governance
 - PL 93-638 “Self governance”
- Integrated Delivery
 - ~190 village clinics: Community Health Aides
 - 7 regional hospitals: Primary care
 - Referral hospital: Specialty care

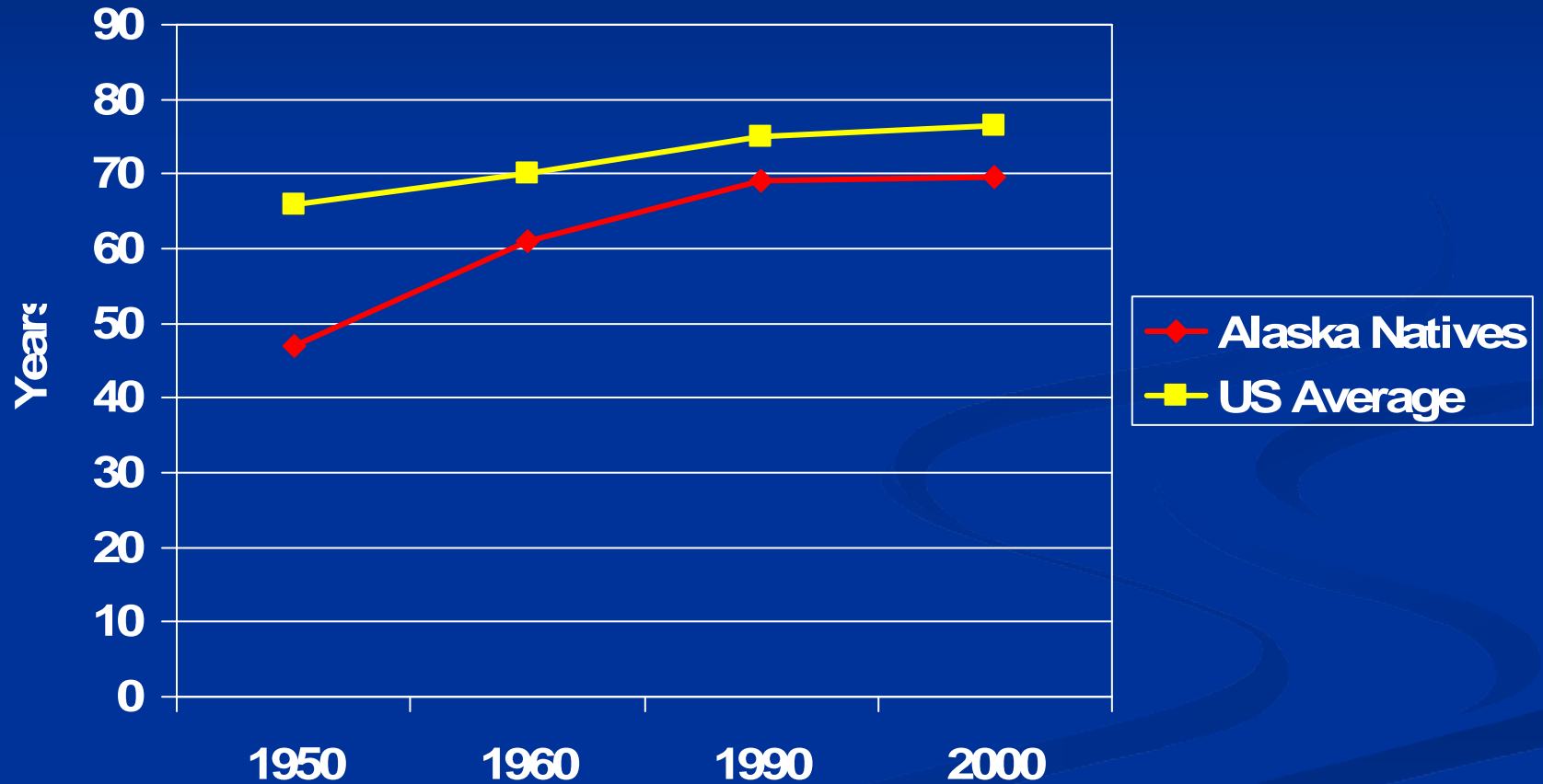
Deaths due to Infections in Alaska Natives



Infant Mortality in Alaska Natives



Life Expectancy, at birth



Success stories in Alaska

- Hepatitis A and B
- Hib disease
 - *Haemophilus influenzae* type b
- Pneumococcal infections
 - *Streptococcus pneumoniae*

Arctic Investigations Program

AIP Priority Areas

- Surveillance of infectious diseases
- Eliminate health disparities
- Detect emerging infectious diseases
- Preparedness and response
- Leadership in Circumpolar health

Success Story #1

Hepatitis A and B

Hepatitis B in Alaska Natives

- 1970's
 - Highest rates of hepatitis B in the United States
 - Among the highest rates in the world
 - High rates of liver cancer and cirrhosis

Hepatitis B Vaccination for Alaska Natives, 1980's

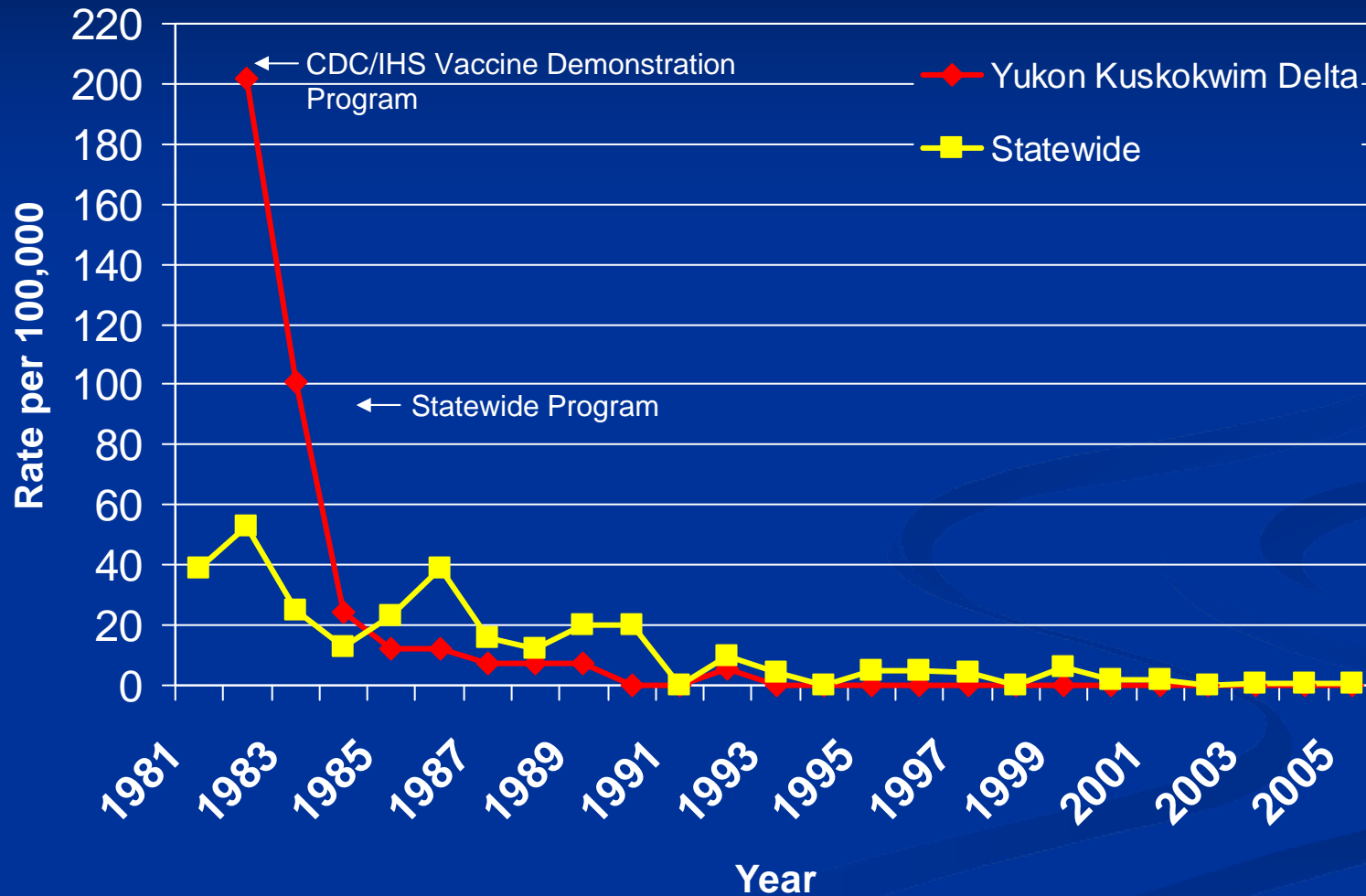
■ CDC and I.H.S.

- Statewide screening program for chronically infected carriers
- Established a vaccine demonstration project
 - Effectiveness
 - Immunogenicity
 - Duration of antibody

■ Alaska Native Hospitals

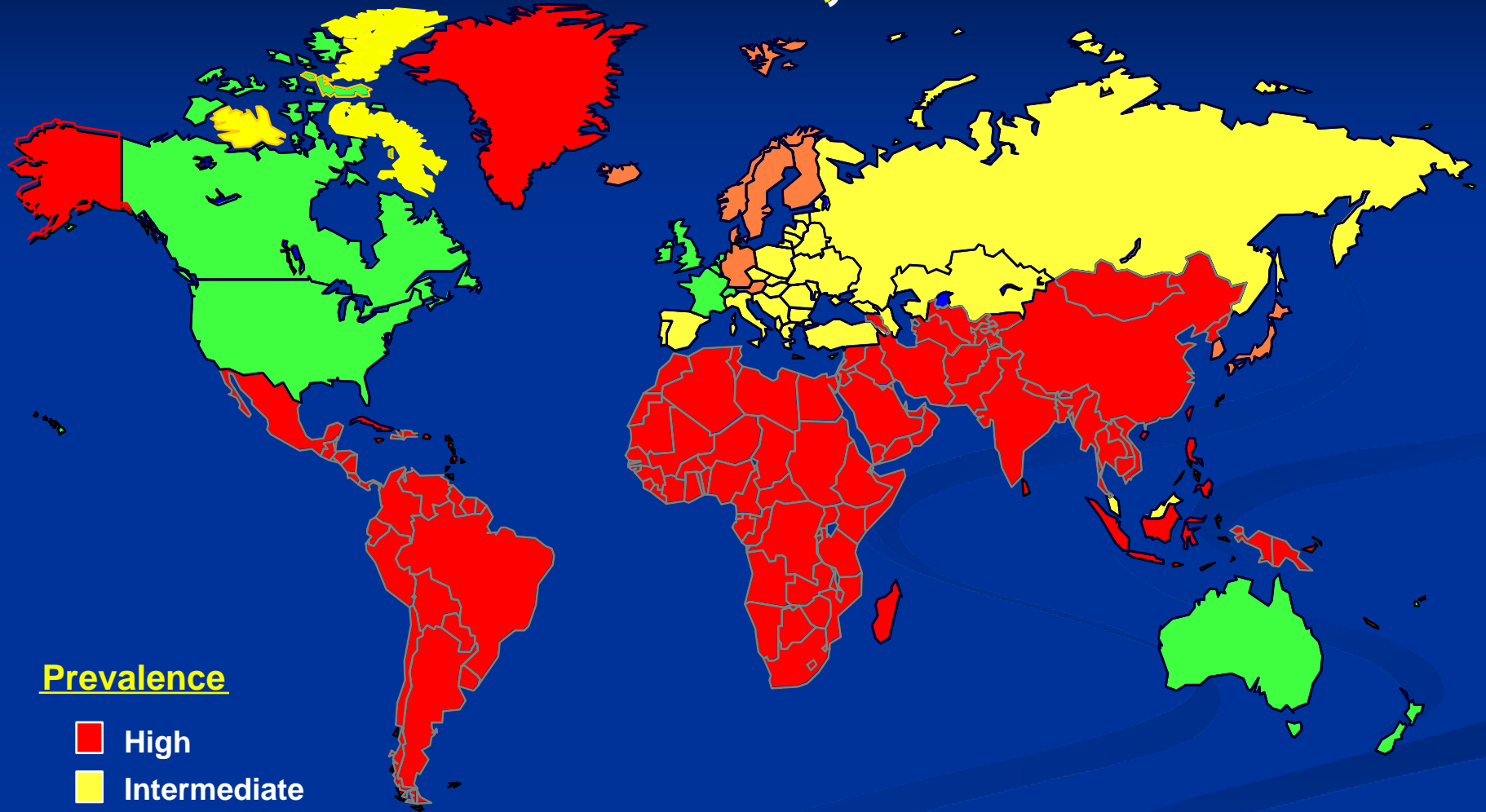
- first in the world to
 - test pregnant women for hepatitis B
 - offer immune globulin to newborns of infected moms
 - introduce universal newborn immunization

Symptomatic Hepatitis B in Alaska Natives 1981- 2005



Hepatitis A

Geographic Distribution of Hepatitis A Infection, 1990



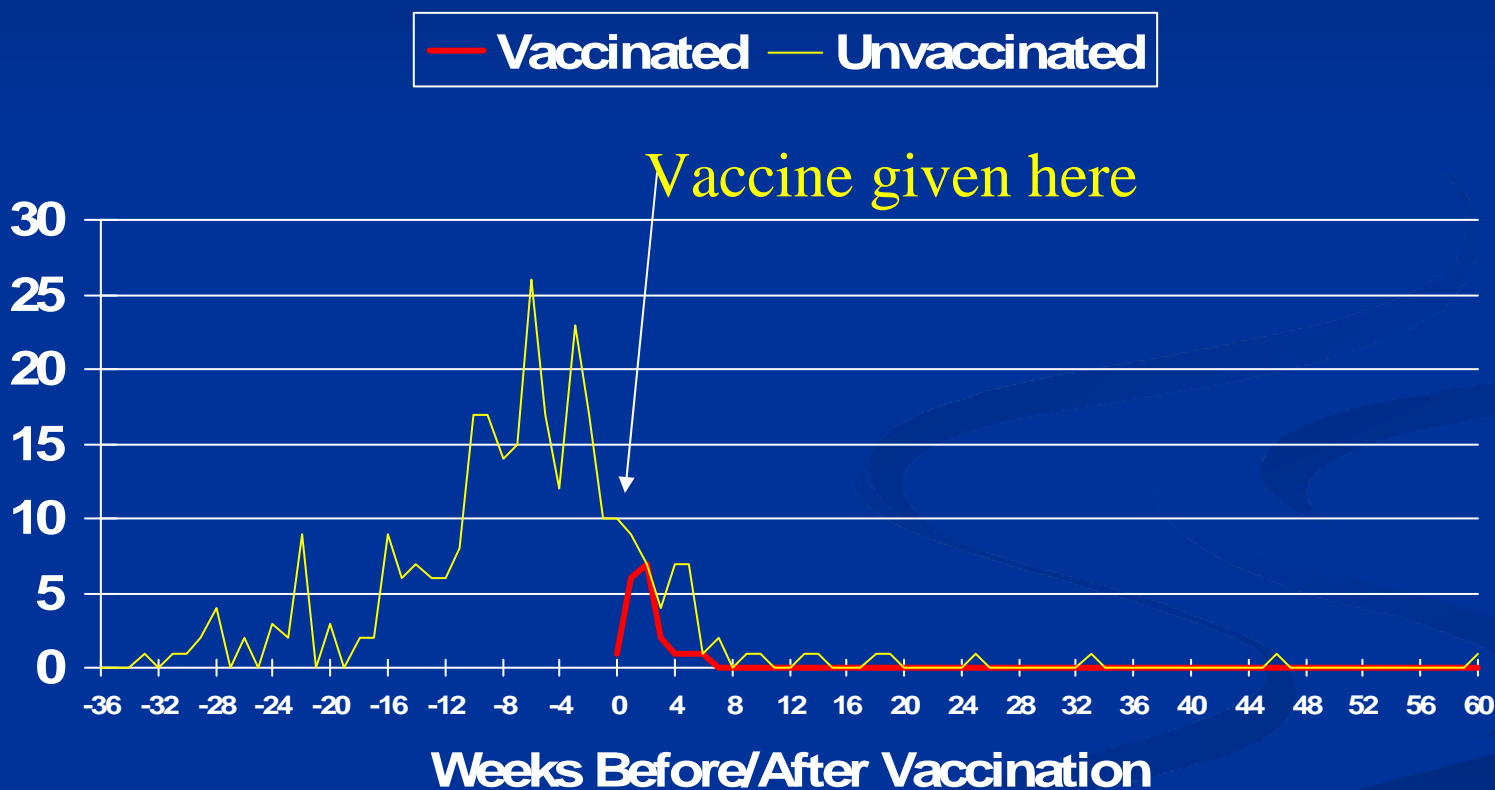
Prevalence

- High
- Intermediate
- Low
- Very Low

Hepatitis A Research in Alaska

- 1989: Hepatitis A vaccine trial in Alaska
 - Native and non-Native adults and children
 - The major U.S. trial in children
- 1993: Hepatitis A outbreak
 - stopped by giving single dose of vaccine to 5000 people

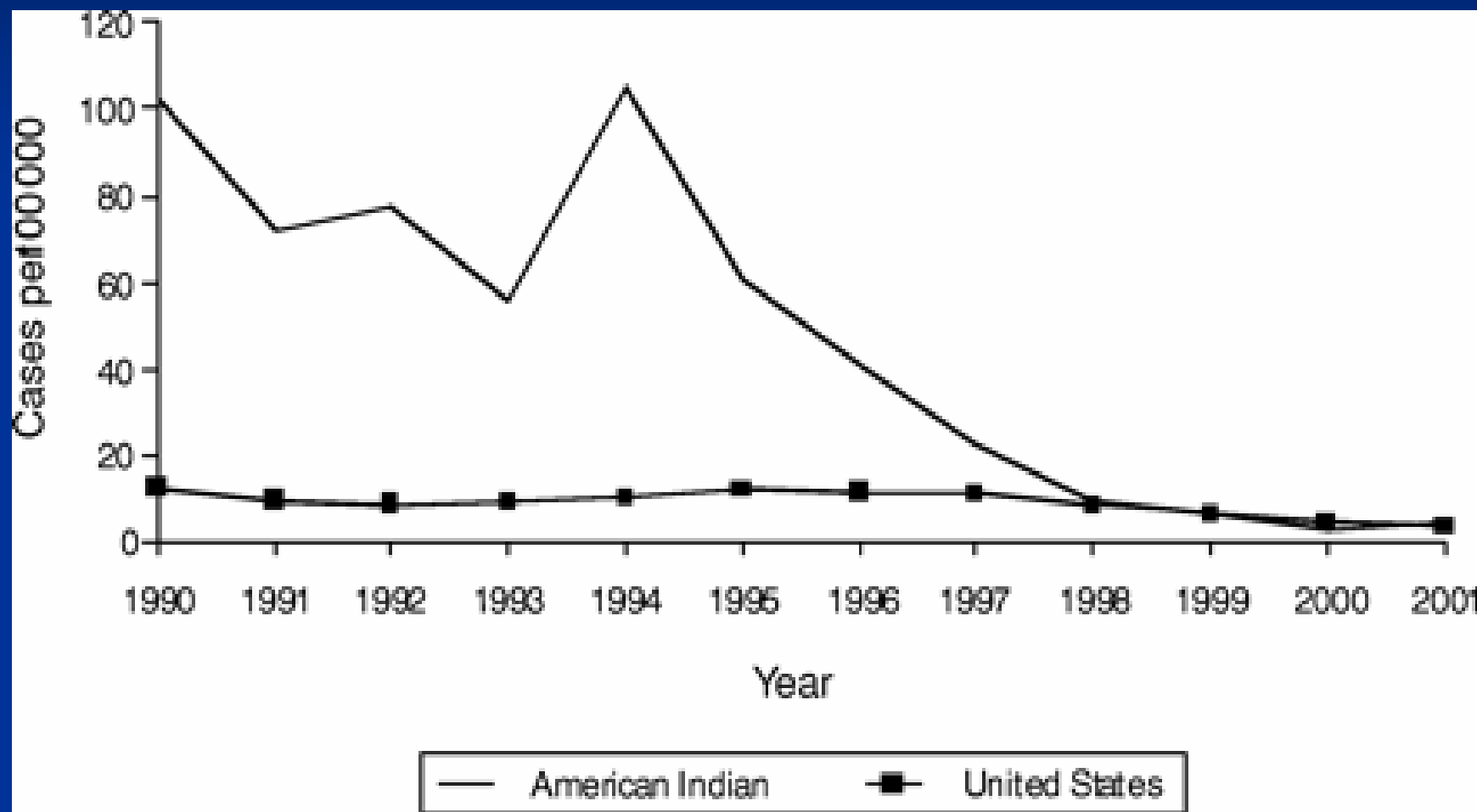
Hepatitis A Outbreak, Alaska, 1993



Alaska: The First State to Offer Universal Hepatitis A Vaccine

- 1996
 - offered to all children ages 2-18 years
- Immunizations
 - > 90% of all Alaskan children have been vaccinated by school entry
- Disease rates
 - Now one of the lowest in U.S.

Decrease in Hepatitis A infections in AI/AN in US



Success Story #2

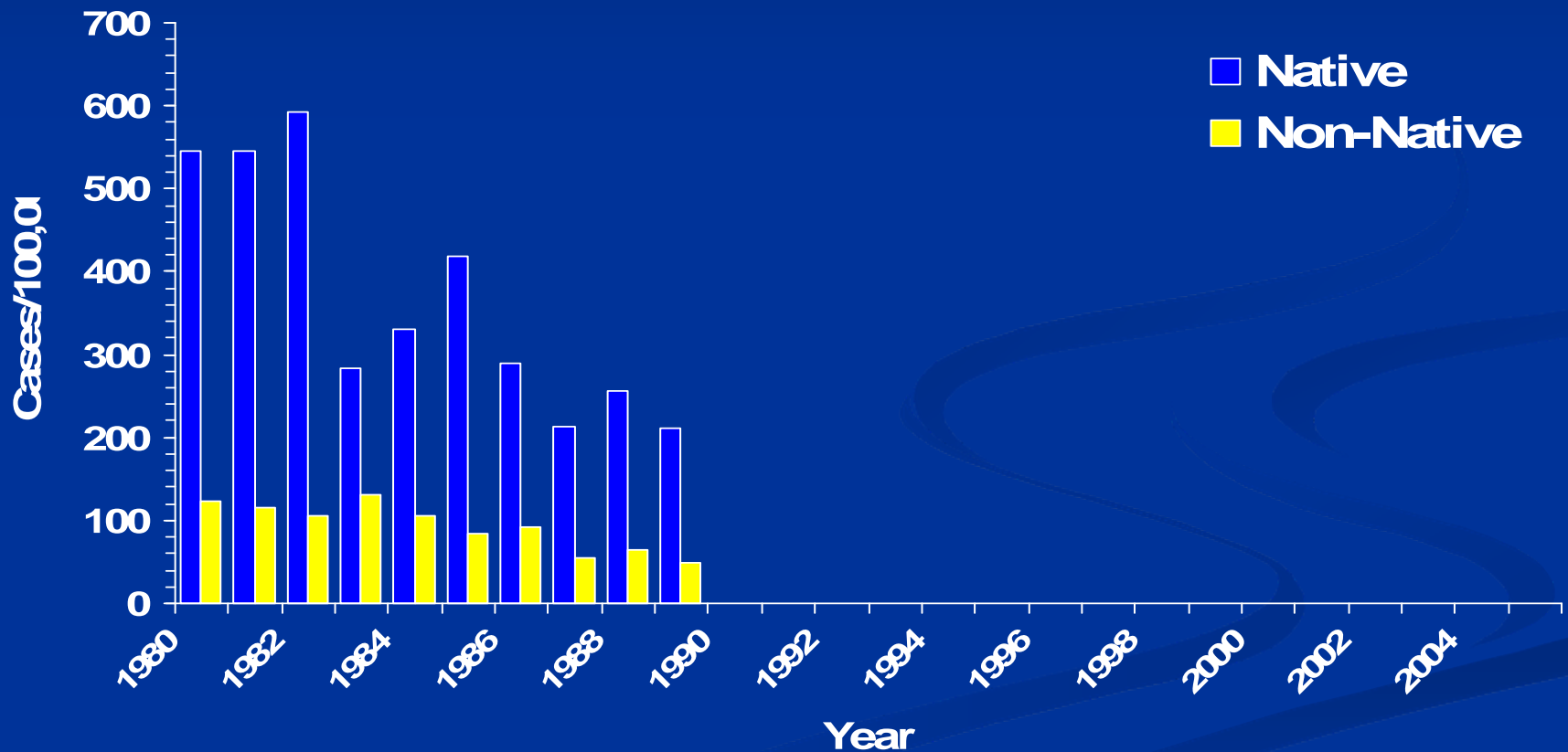
Hib

(Haemophilus influenzae type b)

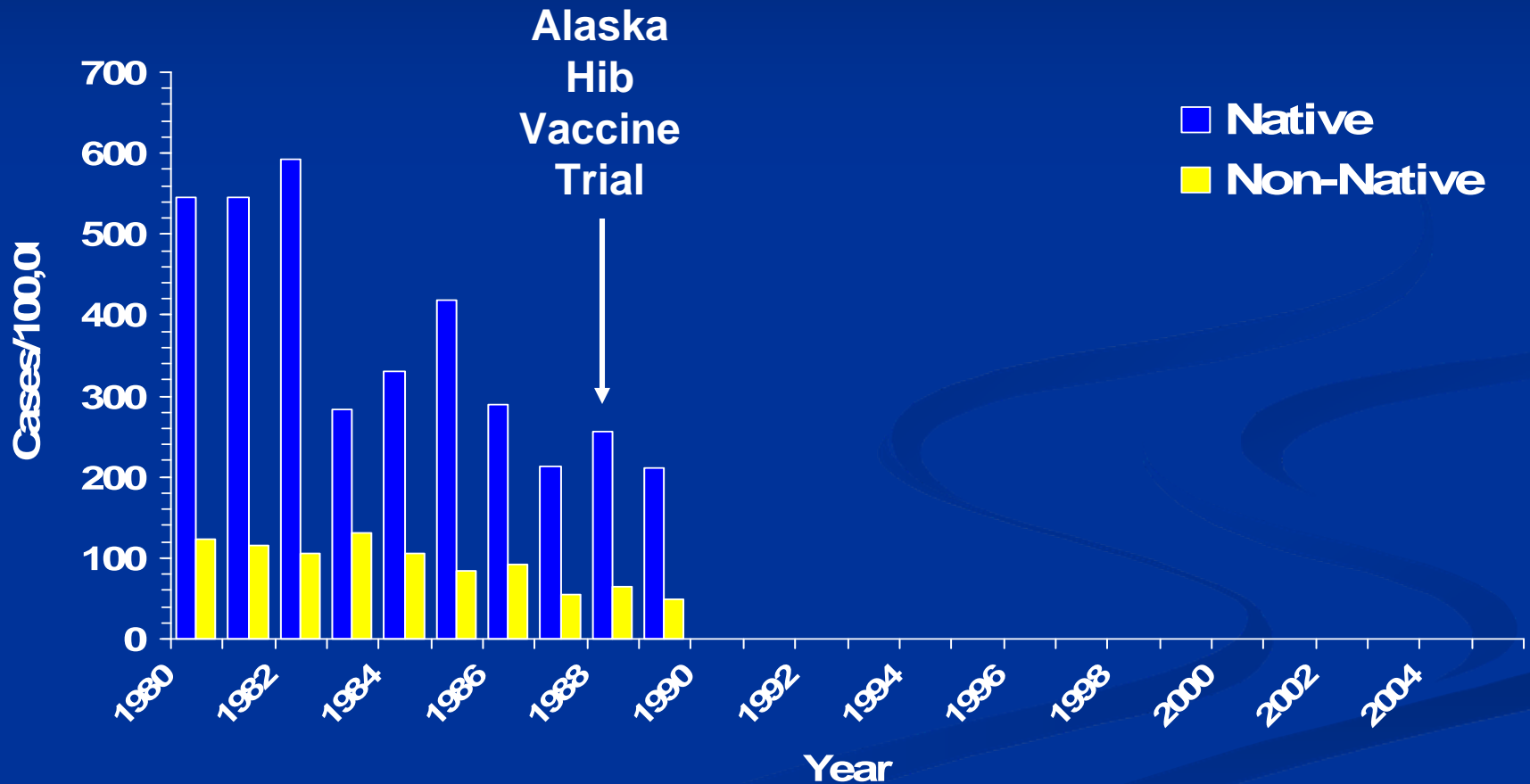
Hib disease

- Bacteria infection
- 1980's
 - #1 cause of meningitis
 - Other serious illnesses: epiglottitis, pneumonia
- Alaska Natives
 - Highest rates of disease in world
 - Up to 7% of infants by age 2
 - 6% died
 - 1 of 3 of meningitis survivors had damage
 - Blindness, deafness, mental retardation

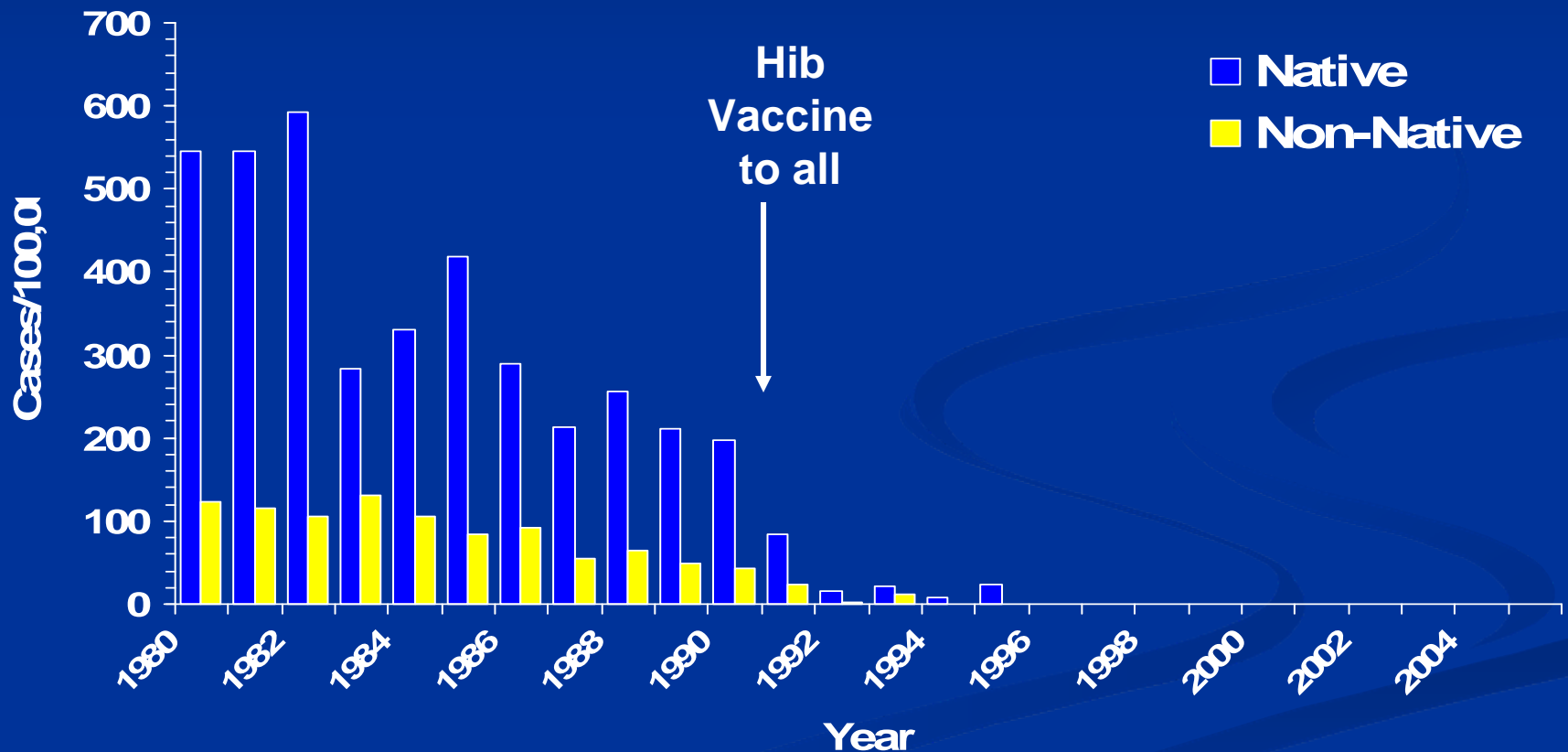
Invasive Hib Disease, Children Aged <5 Years, Alaska, 1980-2005



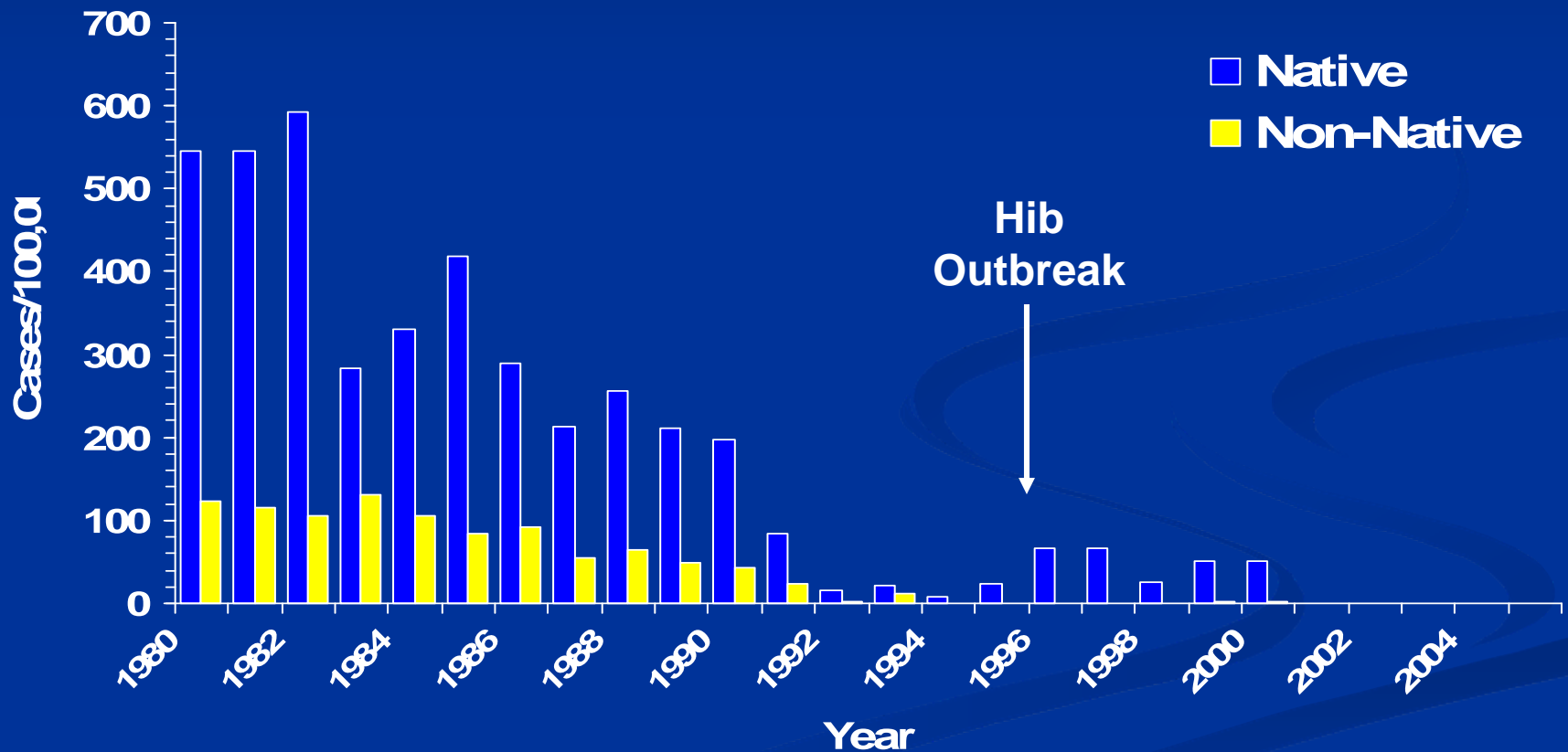
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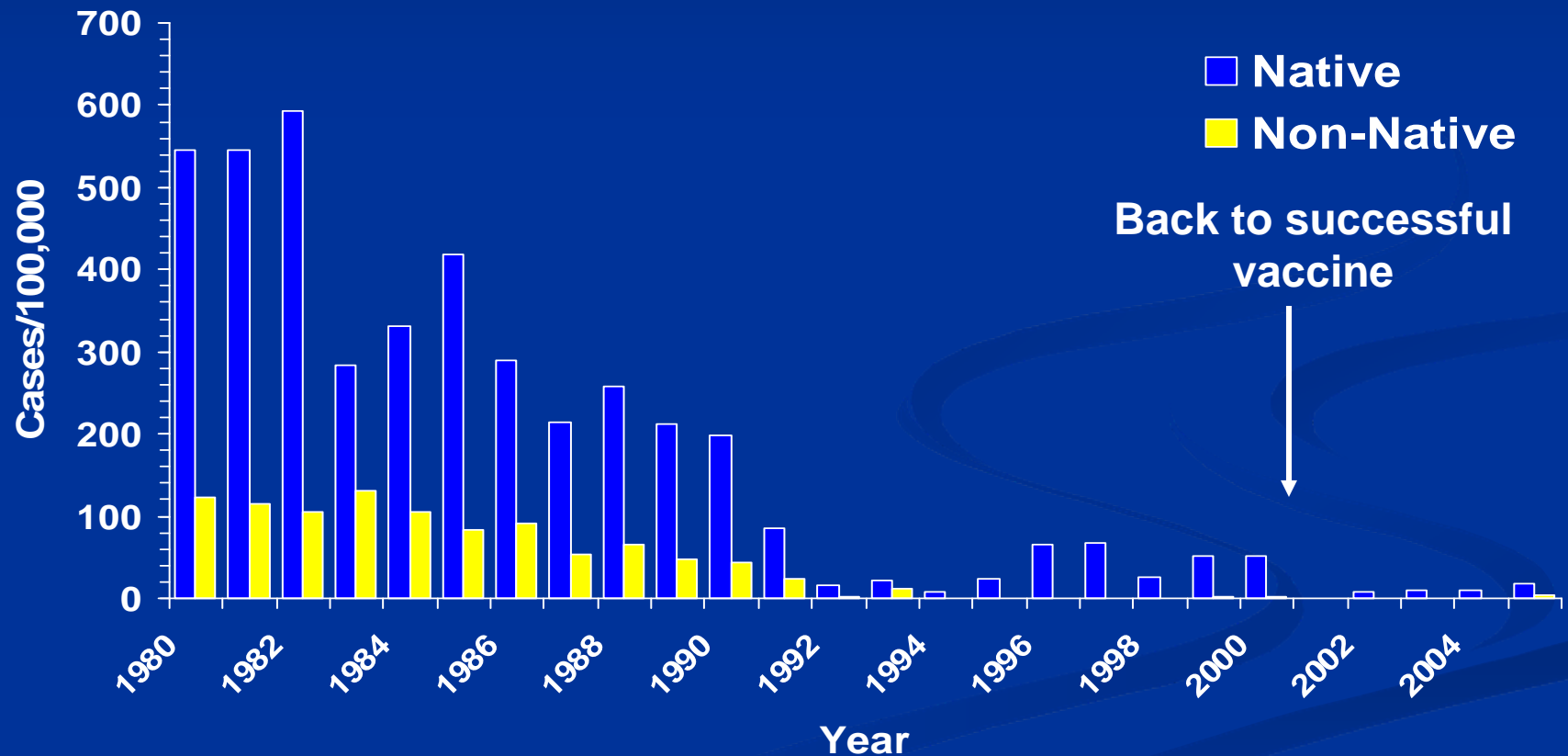
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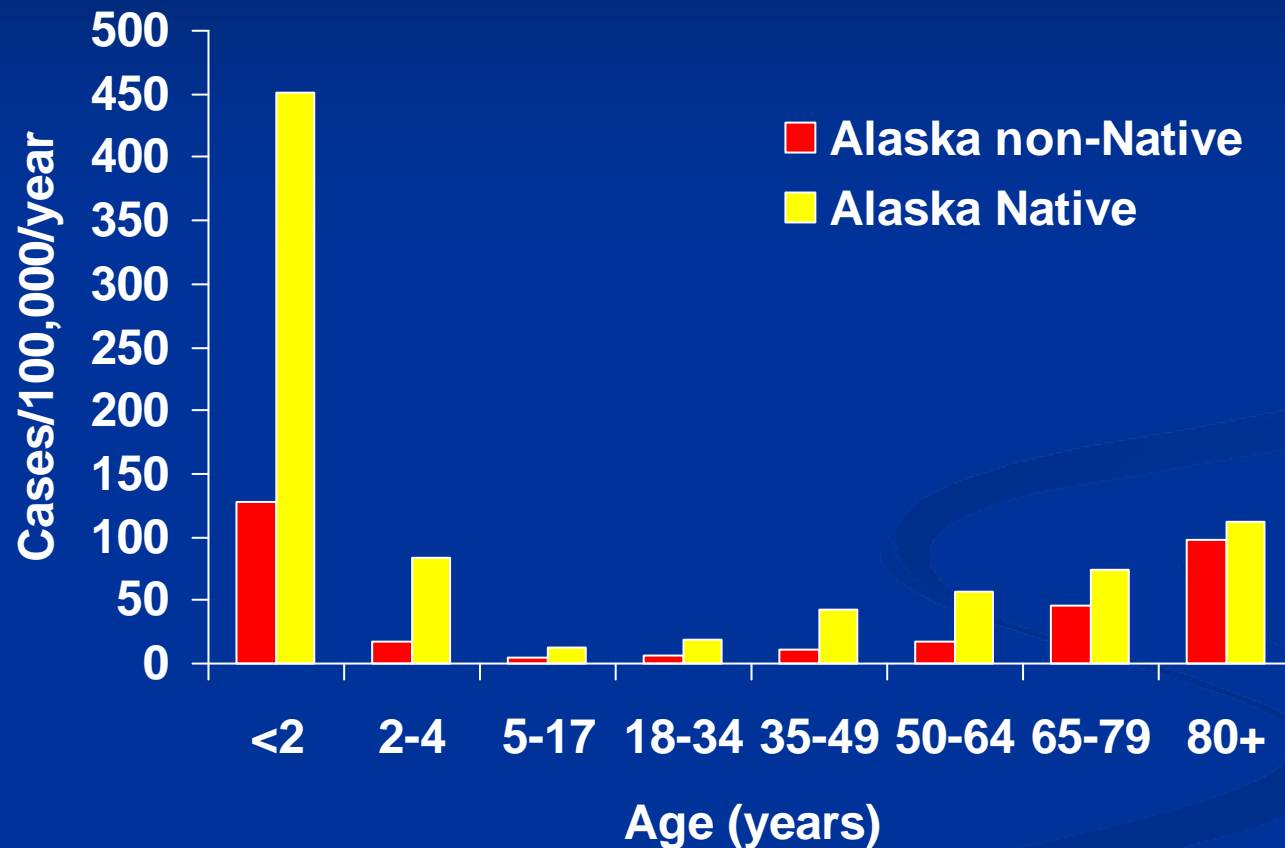
Success Story #3

Pneumococcal Disease

Streptococcus pneumoniae

- Bacteria
- A leading cause of
 - Pneumonia
 - Otitis media
 - Sinusitis
 - Empyema
 - Septic arthritis
 - Bacteremia
 - Meningitis

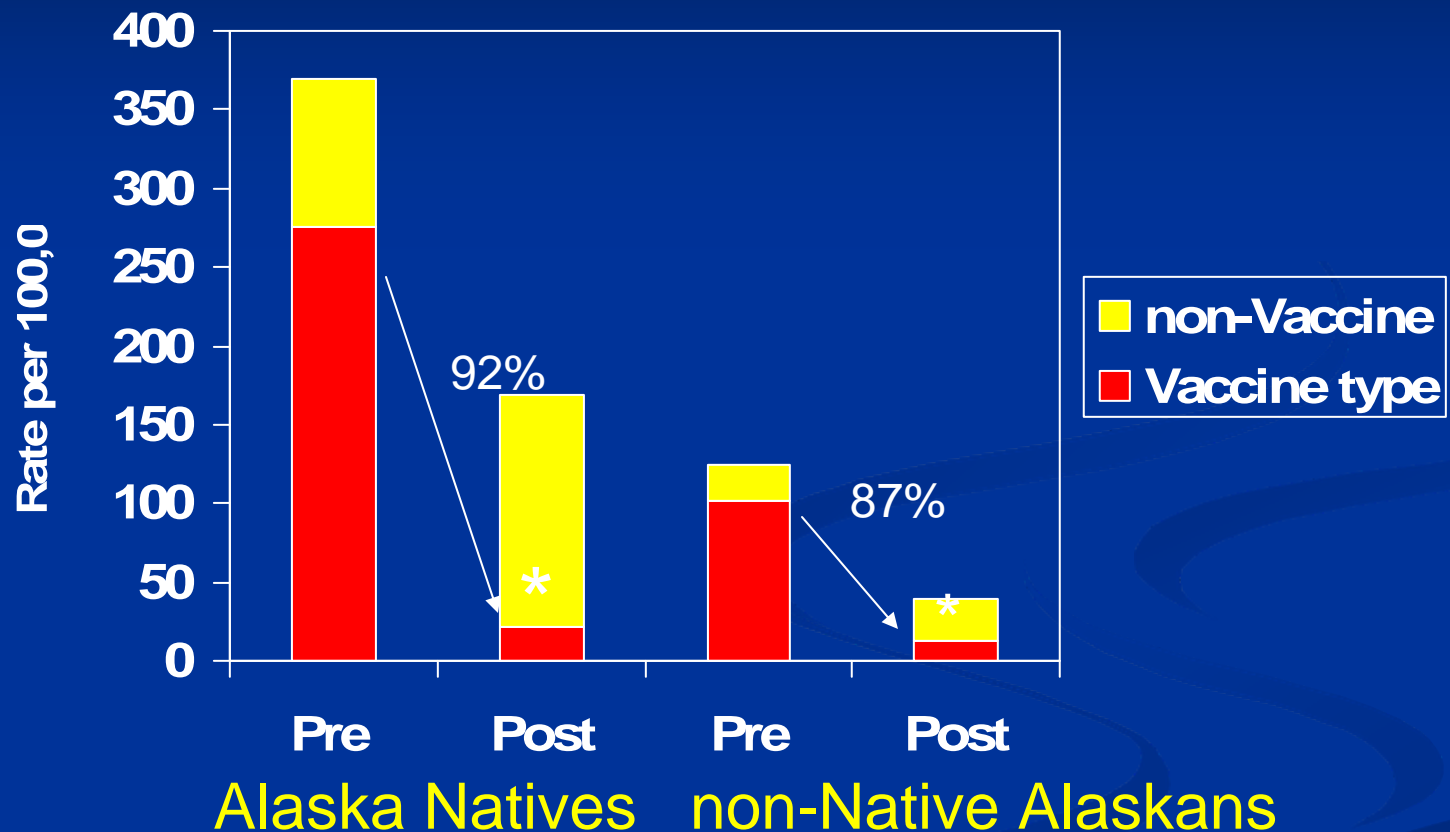
Invasive Pneumococcal Disease in Alaska, 1996-2000



Pneumococcal Vaccine for Infants

- PCV-7 vaccine
 - Used in infants and children
 - Protects 80% of serious and drug resistant infections
 - Used since 2001 in Alaska

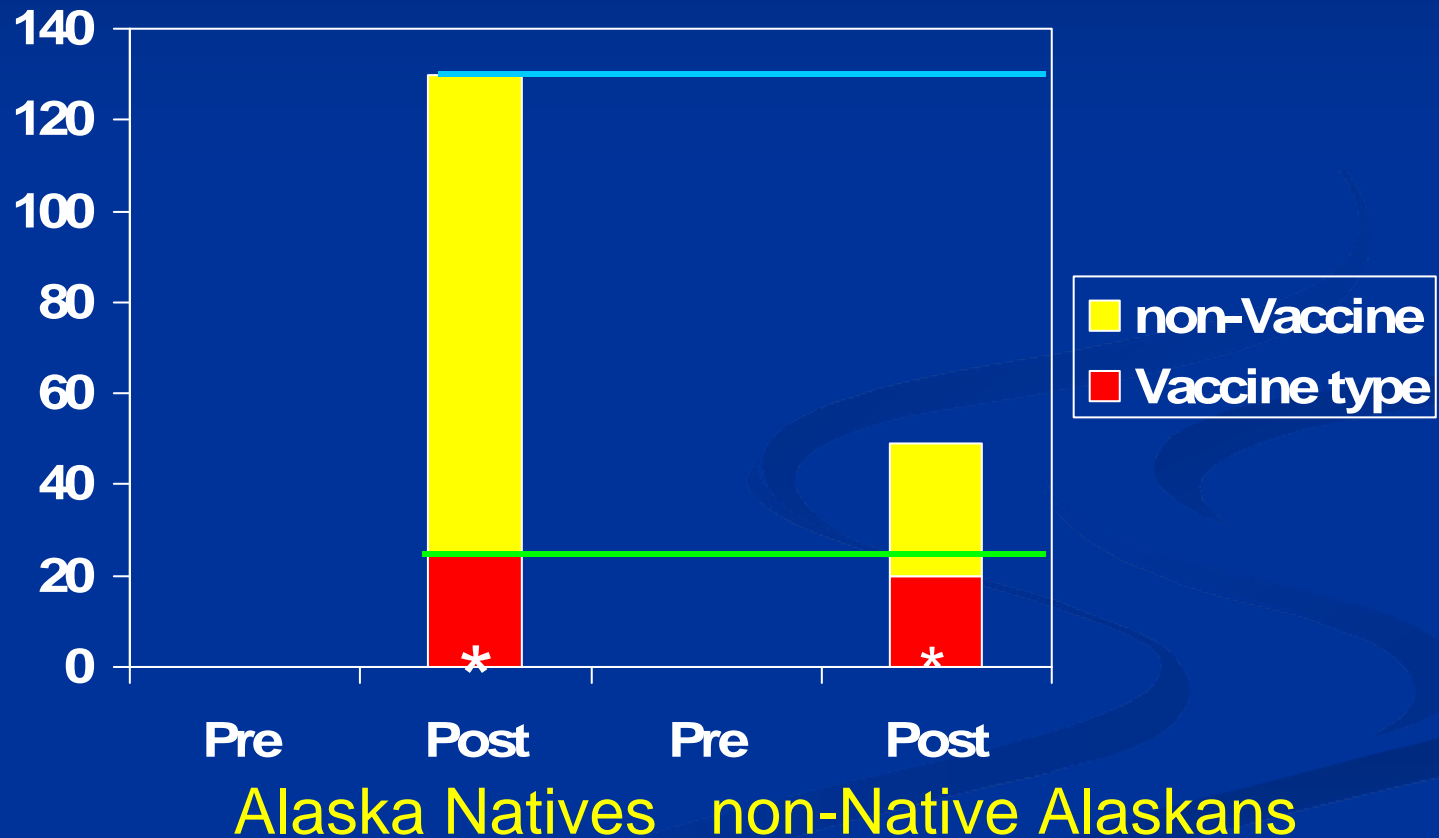
Disease in < 2 year olds, Before and After PCV7 Use, Alaska



• $P < 0.001$, decline in vaccine type

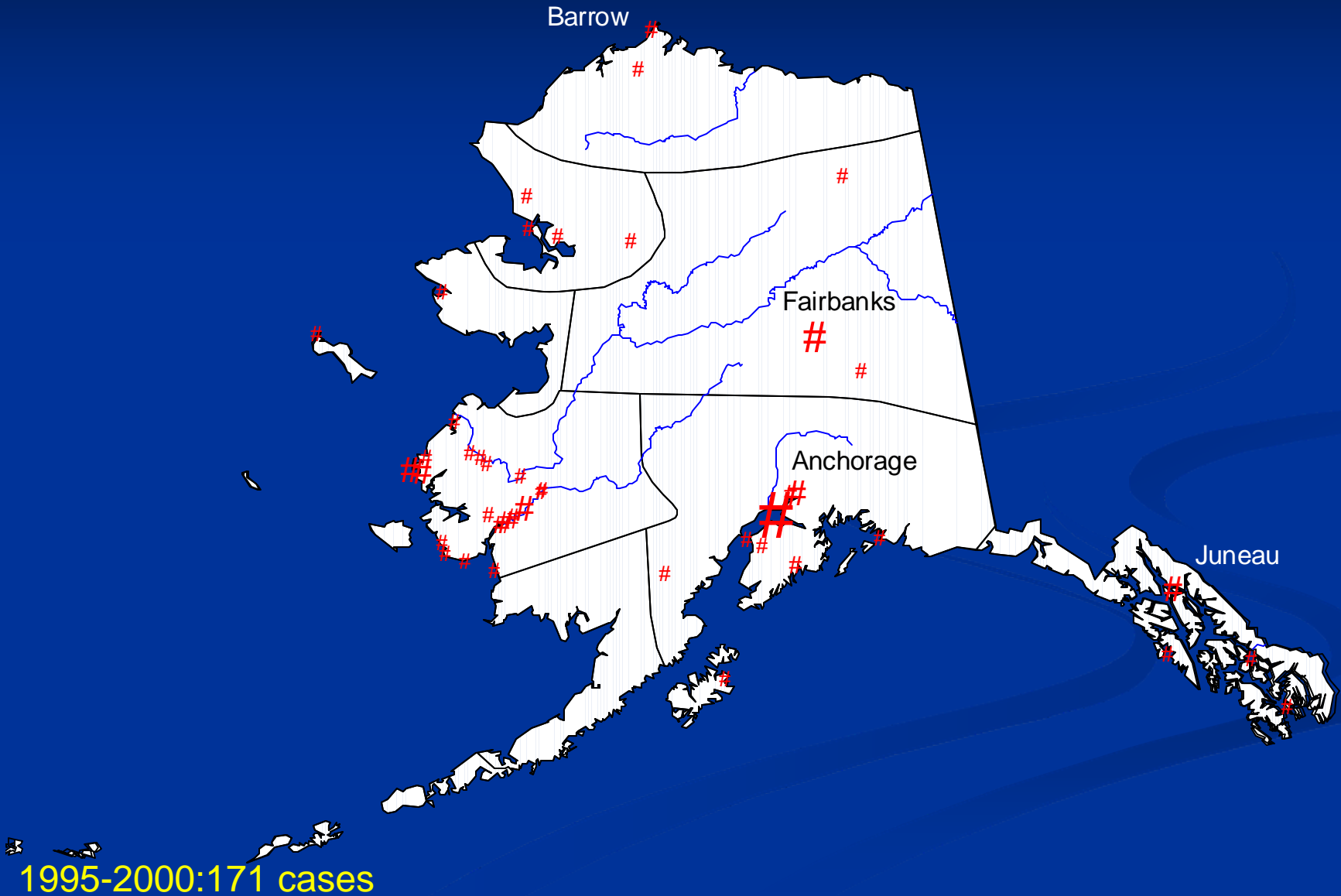
Hennessy, et al, Vaccine, 2005

PCV7 Vaccine Eliminates a Health Disparity for Vaccine-type disease



* $P < 0.001$

Vaccine Type Disease in Children < 5 years old, Before Vaccine Use



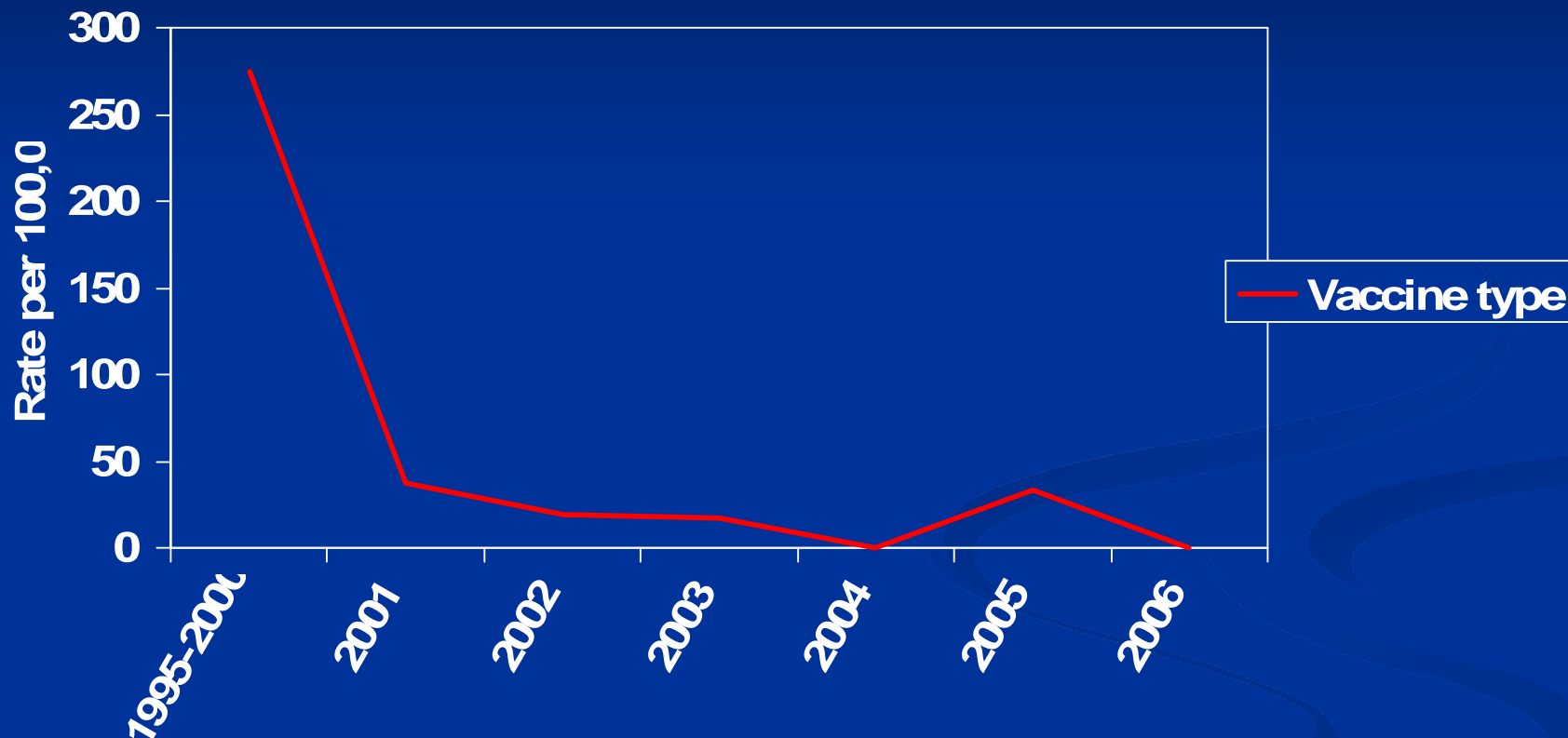
Vaccine Type Disease in Children < 5 years old, After Vaccine Use



2001-5, 21 cases

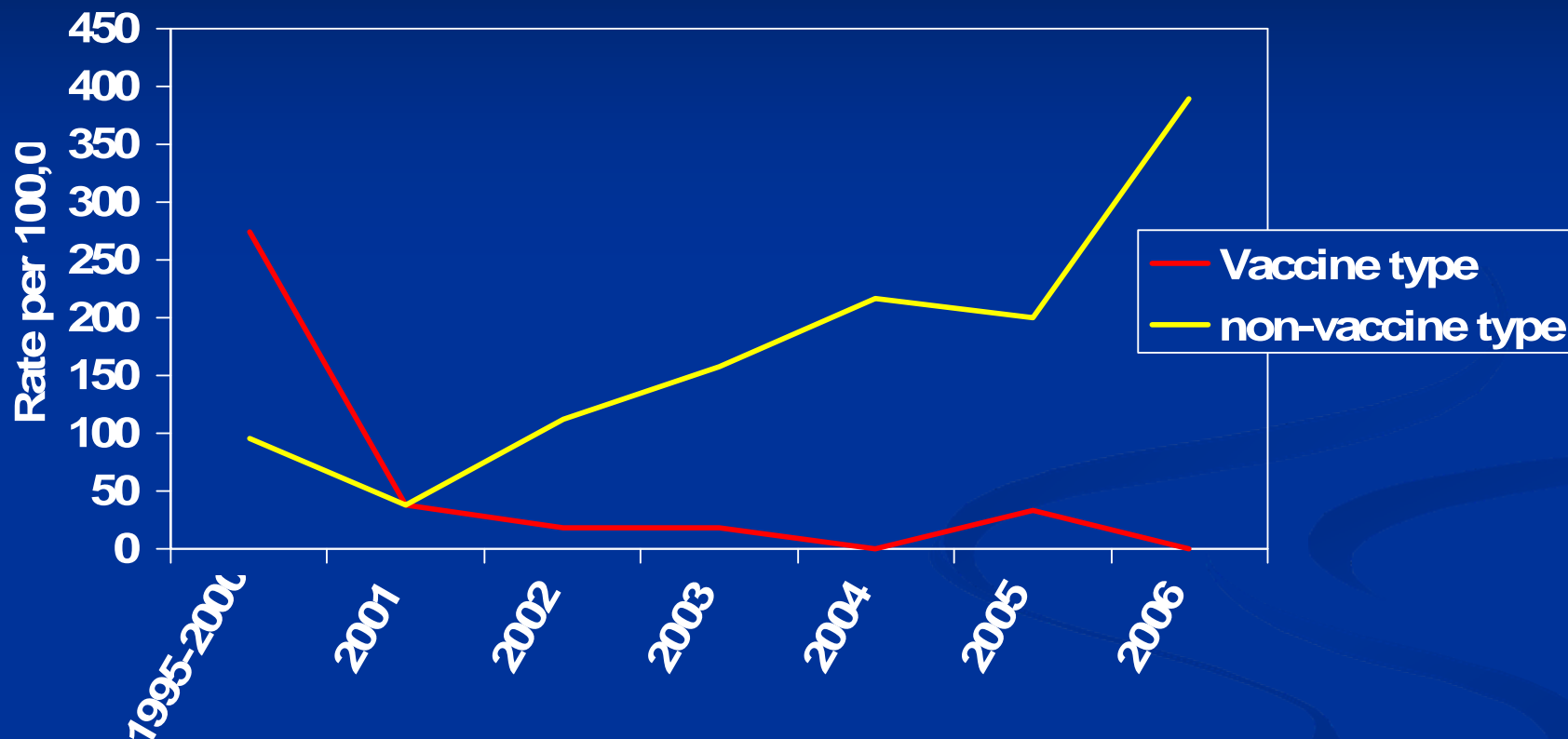
A cautionary note...

Pneumococcal Disease Rates among Alaska Native Children < 2 years old, by Year



JAMA, April 25, 2007
P-value for trend < 0.001

Pneumococcal Disease Rates among Alaska Native Children < 2 years old, by Year



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Remaining challenges for Alaska Natives

- Respiratory infections
 - RSV
 - Pneumonia, influenza
- Sexually transmitted infections
 - Chlamydia, gonorrhea, HIV
- Emerging infections
 - MRSA Boils
 - Diseases from animals: WNV, SARS, Avian Flu
 - Old diseases with new faces
- Infections that cause chronic illness
 - Hepatitis B/C: liver cancer
 - *H. pylori*: stomach cancer
 - HPV: cervical cancer
- Social conditions that lead to infections
 - Adequate housing
 - Running water, flush toilets

Lessons from Success

- Vision of the future
 - “Alaska Natives are the healthiest people in the world ”
 - Plan for the 7th generation
- Collaborative relationships work
- Adequate support needed
 - Prevention programs
 - Scientific evaluation and investigations
- Continued vigilance needed
 - Hib disease outbreak in 1996
- Vaccine success indicates
 - No major immune defect for Alaska Natives
 - Cause of high infection rates is likely social and environmental
 - poverty, crowding, lack of sanitation, nutritional factors

McKinlay-Satcher elements of infectious disease success for Alaska Natives

■ Downstream

- Compliance with immunization
- Willingness to participate in research

■ Midstream

- Integrated health care delivery to every village
 - Diagnosis and treatment
 - Immunization services
- Disease surveillance
- Tribal support for research
 - Willingness to use data to direct policy

McKinlay-Satcher elements of infectious disease success for Alaska Natives, II

■ Upstream

- Recognition of Tribal Sovereignty by U.S.
 - Treaty obligations
- Congressional support for Alaska Viral Hepatitis Program
- DHHS emphasis on Health Disparities
 - Vaccine policy: Vaccines for Children program, 317 funding
- CDC support for Arctic Investigations Program
 - Other CID divisions with Alaska projects

Thank you!

Impact of Alaska Native Hepatitis B Program

- Hepatitis B immunization
 - used worldwide
 - is a W.H.O. standard vaccination
- Alaska Native Health Corporations and CDC/AIP
 - conducting the largest and longest studies of
 - Persons vaccinate for Hepatitis B
 - Persons with chronic Hepatitis B infection
- Questions remaining
 - How long with protection from hepatitis B vaccination last?
 - When are booster doses needed?
 - What are best treatments/screening for chronically infected?